

VERIFYING THE AUTHENTICITY OF PRINTED DOCUMENTS

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TECHNICAL FIELD

This invention relates to electronic commerce in general and in particular to a system and method for establishing the authenticity of a past electronic communication at the point of the consummation of the commercial endeavor which is the subject of the electronic communication.

BACKGROUND

Electronic commerce is everywhere now. People are using the Internet, as well as other remotely accessible locations, such as kiosks, to order goods and/or services. Some of these services require verification of prior payment and/or reservations at the time the service is being offered which typically is sometime after the actual purchase (or reservation) was made. For example, assume a person desires to reserve a seat on an airplane, or a room in a hotel, or a rental car, or a seat in a theatre, all from a remote terminal. Typically, that person would get into communication contact with a reservation system. This communication can be with a live person at the selling end or could be with a computer acting in an interactive mode or a combination of the two. The reservation would be made and arrangements would be made to pay for the reservation. Then the problem arises; how does the purchaser demonstrate to the gatekeeper at the airline (or to the rental car gatekeeper; or to the theatre usher) that the service has been paid for?

The obvious answer is that a ticket, or other indicia of the transaction, is printed at the purchaser's terminal and that printed ticket is used to identify that the services have been paid for. That might work when the paper stock that the receipt information is printed on is closely guarded and very distinctive. It will not work for obvious reasons where general purpose printers are used to print the receipt at the purchaser's premises.

If electronic commerce is to flourish then it is mandatory to have an arrangement whereby the purchaser can obtain immediately upon purchase a printed verification of the transaction in a manner which allows for universal printing while still allowing the printed receipt to act as a final verification of authenticity at the point where the actual services are rendered.

SUMMARY OF THE INVENTION

These and other objects, features and technical advantages of my invention have been achieved in one embodiment where a system and method is utilized for establishing a commercially available partially preprinted form where the form has printed on it information used by the service seller during the initial transaction communication period for establishing integrity control for subsequent verification. In one embodiment, the form is available to any purchaser for use with any general purpose printer operable in conjunction with a PC or other communication/computing device, including so called "dumb" terminals. This form is advantageously preprinted with both human readable data and machine readable data. As will be seen, the machine readable data, which I will call an indicia, contains key information which serves to help decode material that is subsequently printed on the form under control of the central validating system.

In operation, the purchaser enters into an interaction communication with the seller of the service. This may be, by way of illustration, from the purchaser's PC at his/her home via the Internet to a web site maintained by the seller. The user has obtained one or more preprinted paper forms from a supplier of forms. The weight of the paper is not critical and the forms may be any weight stock. The user inputs the human readable data from the exact preprinted form that the user intends to use. This input can be by verbally reading the data or by scanning the data or by any other system. In situations when there is no human readable material preprinted on the form, the user would scan in the machine readable portion. Some portion of the preprinted data is unique to the exact form selected by the user at that time.

The seller, upon receipt of the unique data from the user pertaining to the selected form, verifies that this exact form identification number has not been previously used. Since each preprinted form has a unique identification code, this initial screening process insures that a copy of the preprinted form is not being used. The seller then uses the unique identification number to establish an encryption code for printing on the form a machine readable security

indicia. It will be this security indicia that will subsequently be used in conjunction with the original preprinted indicia to verify the authenticity of the information to be printed on the form. The seller then sends information to user so that the user's printer will print on the form all of the information that will be used by the purchaser to subsequently obtain the service.

5 When the purchaser arrives at the location where the services are to be rendered (in our example, at the airport) the purchaser's form will contain luggage labels (printed when the security indicia was printed) and a boarding pass. A receipt will also be printed at the time the security indicia was printed. The boarding pass contains all of the information necessary to properly route the luggage to the final destination. This routing information may be both human readable and mechanically readable, perhaps in several different formats.

10 For verification of the authenticity of the boarding pass and/or the luggage tags, the original preprinted indicia is read to obtain a decryption key. This key is then used to decrypt information stored in the security indicia that was printed at the time the remainder of the form information was printed. If the key is not present on the preprinted form, or if the key differs from the key assigned to that form in conjunction with the human readable data that was inputted by the purchaser during the initial payment and/or scheduling session, then the data on the form will not be verified and the holder of the form (boarding pass) will be denied service.

15 Note that the printer can be any printing device for creating images on paper, or it could be a device for storing images which can later be displayed to obtain the goods and or services. For example, the image can be created into a memory and that memory can be later used to create a display, or to print a paper or other media copy, which is scanned or observed by a gatekeeper at the point where the services are to be rendered. The recreated image can be electronically scanned using the preestablished key to decode the newly created validity information. Such a system can be useful when a memory device, such as a smart card or PC, 20 is used to gain access to a theatre, to rent a car or to board an airplane. In such a system, the memory device interacts with the seller of the service at an earlier point in time, usually several days or weeks earlier, and during that interaction availability of the service is confirmed, a

reservation is made, payment is arranged for, seat assignments issued, and images (or other forms of data) are recorded in the memory in a manner such that such images will not be verifiable unless they are decoded using some portion of the preestablished memory data.

5 The foregoing has outlined rather broadly the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features and advantages of the invention will be described hereinafter which form the subject of the claims of the invention. It should be appreciated by those skilled in the art that the conception and specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the appended claims.

BRIEF DESCRIPTION OF THE DRAWING

For a more complete understanding of the present invention, and the advantages thereof, reference is now made to the following descriptions taken in conjunction with the accompanying drawing, in which:

- 5 FIGURE 1 shows a sample preprinted blank form;
- FIGURE 2 shows the form of FIGURE 1 having created thereon luggage tags and a boarding pass;
- FIGURE 3 shows a typical user workstation;
- FIGURE 4 shows a typical seller work system;
- 10 FIGURE 5 shows a typical point of sale verification system;
- FIGURE 6 shows a simple algorithm for authenticating the printed form;
- FIGURES 7A-7C show a series of preprinted blank forms; and
- FIGURES 8A-8D show tickets printed using the blank forms of FIGURES 7A-7C.

DETAILED DESCRIPTION

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Turning now to FIGURE 1, form 10 is the original display media which, in one embodiment, can be ticket stock printed with indicia 16 thereon. Indicia portion 16a can be a machine readable portion of the indicia (which can be, for example a Universal Bar Code, an Intermec Corporations' Code 49, or a Laser Light System Inc.'s Code 16K, or any other type of machine readable code) and portion 16b is a human readable portion. Note that for the purposes of this invention the indicia can be entirely machine readable or entirely human readable, if desired. In addition, the human readable portion could be a different form of the indicia, such as bar codes that can be machine readable. In the embodiment, form 10 is divided into sections 11, 12, 13, 14 and 15 each separable by perforated lines 102, 103, 104. These lines can be traditional perforations, or they can be simple folds. In some situations there need not be any perforations or folds.

As will be seen in FIGURE 2 for an airline ticket portion 13 of ticket stock 10 is printed with the necessary boarding information. In such a situation, section 14 would be the passenger's copy of the boarding pass, section 15 would be the passenger's receipt, and sections 11 and 16 would be the luggage tags that would be preprinted. Thus, the luggage tags can be removed from the printer and ticket stubs 13, 14 and 15 can be separated along the perforation lines. Paper on the backing of the ticket stub area (not shown) can be removed to reveal a portion which has a sticky substance thereon which would allow the tags to be placed in the traditional manner on the luggage to form a loop around the handle.

Turning now to FIGURE 3, a user using system 30 who has obtained one or more portions of ticket stock 10 places a ticket form or a series of ticket forms 10 in paper tray 360 of printer 36 which is connected to processor 33, which in turn accepts inputs back and forth between keyboard 32, display 31, scanner 34 and communication control 35. The user then makes communication contact with a seller (FIGURE 4) via communication control 35 and signal link 301. Signal link 301 could be wireless, wireline, or any other combination system. The internet can be used for this purpose or direct phone line connections combinations thereof. In a typical situation, software would be controlled by processor 33 and the user of

keyboard 32 and display 31 would interact with the seller at system 40 FIGURE 4 to arrive at a desired flight, cost, time, seat assignment, return trip or intermediate stops. This would all be accomplished in a well known fashion, either verbally on both parts, or by one or both parties communicating without the intervention of a human on either of both sides. The user at system 30 and the seller at system 40 come to a meeting of the minds with respect to the payment and other terms. The user at 30, either verbally or via scanner 34 (which can be part of printer 36 if desired) reads off the human readable portion of code 16b shown in FIGURE 1.

This data is communicated via link 301 to communication control 41 and processor 42. Processor 42 operates in conjunction with data base 43 and determines whether the code that has just been received from the preprinted form is a valid code. This determination can be based upon several factors, one factor being that the code has never been used before, thereby ensuring that it at least appears to be unique to this form. Also, the verification can determine whether the code number is within an acceptable range for this user. Various other parameters can be checked. In one embodiment, processor 42 working in conjunction with data base 43, would know that the original machine readable indicia on ticket stock 10 portion 16a has contained within it a particular key which had been preassigned prior to the printing of the ticket stock. Processor 42 then utilizes a coding algorithm which is secret to it, but which is based on the key contained in the original printed indicia. Utilizing this information, processor 42 formulates a printed message which is transmitted via communication channel 301 to FIGURE 3 system 30 and via communication control 35 to processor 33 which then controls printer 36 to print the ticket such as is shown in FIGURE 2.

Note that the printed ticket in FIGURE 2 has a second indicia 21 which is machine readable similar to indicia 16a and decodable only by utilizing the key which is contained in indicia 16a. Indicia 21 has been especially created by processor 42 in FIGURE 4 under control of the previously transmitted data from the buyer and will serve to verify the authenticity of the ticket when the user arrives at the terminal for boarding the airplane, or when the user, in another situation, arrives at a theater. The printed control indicia is



compared using the embedded key from the original indicia to decode the printed indicia to authenticate the validity of the ticket. As previously discussed, this can be used for renting cars where the actual information is given to the user preprinted ahead of time at the user's location and the printed indicia is used to allow the car to be removed from the lot via the mechanism above described. Note that more than one control indicia, or key indicia, can be printed on any form.

Turning now to FIGURE 5, when the user arrives at the point of utilization, i.e., the boarding gate of the airline, bus station, train station, or at the exit gate of the rental car agency, or at the entrance to the theater (so that the preprinted commercial transaction is about to be authenticated and the services actually rendered based upon a preestablished commercial transaction between the parties) reader 51 reads the information that is on the preprinted ticket including the original indicia 16a and the new indicia 21. This information is provided to processor 52 which then extracts the key from the data contained in indicia 16 for decoding the data in indicia 21, thereby enabling a determination that the passenger is okay to go, via display 54, or that the ticket is not valid, via display 55. Processor 52 can transmit and receive information via communication control 56 overlink 501 to communication control 41 in FIGURE 4. The purpose of this link can be two fold if desired. 1) When the initial transaction is consummated, processor 42 can operate to transmit the information via link 501 to processor 52 and its database (not shown) indicating that certain information has been printed on various tickets. This would serve as a further backup to the decision process at the time of offering of the services since the indicia that has been printed is expected at that period of time from the information given at the time of the booking. For example, seat information and other information including information pertaining to the printed indicia 21 can be communicated to processor 52 so that when printed indicia 21 is presented, processor 52 can utilize its intelligence to determine the validity of the printed indicia to further check that copies are not made and that the services are not given to the wrong person or to many people utilizing the same numbers.

FIG 5
 This system cuts down on fraudulent operations and even if an unscrupulous operator were to make copies of a printed ticket, only one such ticket could be processed at processor 52 because the second one would block since it would no longer be valid for transport or for the rendition of services. Thus, the user of the ticket stock would be in no different position than if the user were to obtain a ticket and have somebody steal the ticket and/or copy the ticket, since control indicia 21 would only have been printed upon the consummation of a commercial transaction, which implies that a means of payment had been agreed upon between the parties.

FIG 6
 Turning now to FIGURE 6, a simple flow chart is shown to show the operation just described and box 601 of the ticket is read and box 602 determines if the format of the entire ticket including indicia 16a and 21 is accurate and proper. In this respect there can be, if desired, interaction between information at the local service rendering position and the central data base box 604. If the format is wrong, the transaction is stopped via box 602. If the format is proper, then the original indicia is read box 603 to determine the key which would be used to decode indicia 21 prior to such utilization of the key. The key is checked via box 605 to determine if it is a valid key. Again this validity check can be done in cooperation with information received from the central data base, if desired, via box 604. If it is a valid key, then the key is used to decode the information from the printed indicia box 606 which provides information to processor 607 which verifies the authenticity of the data on the remainder of the ticket and determines (optional) if the parameters (time, date, sequence, etc.) are correct for the passenger of this receipt box 609. Again this information can be used to update the central processor if desired to maintain central control. Box 610 controls whether the bearer may board or enter the *theater* ~~feeder~~ or remove a car from the lot or any other commercial transaction controlled by the ticket or other display utilized at the time of the actual rendering of the service or the obtaining of the goods where the goods or services have been paid for in a prior arranged commercial transaction.

Note that while we have been discussing airlines and rental cars and theaters, this same procedure can be used to obtain merchandise at one point in time where the merchandise has

been preordered and prepaid for and receipts generated at a home or office at a general purpose printer using special paper stock which has been printed on a unique identification code. These codes have been used to create a separate indicia which is coded with a decoding being controlled by a key obtained from the originally printed indicia. Also note that while we have been discussing material forms, this system could work just as well with an electronic display device visual or otherwise where certain portions of the data can be electronically coded and subsequently decoded utilizing a key which is contained in the original information.

FIGURE 7A shows blank stock 70 which has been divided into three sections 71, 72, 73 each having printed thereon an indicia 16, which has a machine readable part and a human readable part. Note that the last two digits in our example 02, 07 and 08 are individual to each form with respect to sections 71, 72 and 73 and need not be in sequential order. These individual last digits could signify the actual sheet number of a form 70 or the individual section number. FIGURE 7B has three more sections 74, 75, 76 and FIGURE 7C has an additional two sections 77, 78. These sections could all be part of one long roll of forms or could be different form sheets with different numbers of blanks thereon.

Turning to FIGURE 8, a user having a sheet of blank form 70 inserted in the user's printer may order a series of tickets for different sporting events, theaters, lotteries and the like. The user upon connection to a common server which serves several different such sporting events may order and pay for the tickets which will be printed as discussed above. These are shown in FIGURES 8A and 8B.

Note that indicia 16 can be printed on the sheet and can include either or both machine readable and human readable sections and also this mark may be presented to the users in various forms, one of which could be watermarks built into the paper which could be uniquely identified if desired. Also note that this system could be utilized for printing travelers checks and other commercial paper following the procedures outlined above. These checks would then have printed on them the proper logos and markings for signature by the user when the user utilizes the printed "check" to purchase goods or services. The check would have printed on it the printed indicia as well as the initial indicia so that the acceptor of the travelers check

could, if desired, run the check through a scanner or other reading device to determine the authenticity of the check.

Note also that when a consumer is ordering tickets, the ordering need not be from the same seller but may be from a plurality of sellers. For instance, the user may call for baseball tickets to one seller, football tickets to another and perhaps call for tickets at a distant city. In each case, the seller would utilize the information transmitted by the seller which is unique to the ticket stock currently in the printer. This information would be communicated by the seller's system to a central database to determine what physical position on the ticket stock this particular ticket should be printed and to also determine whether the unique number identified with this ticket has been previously utilized. Thus, user can have printed at their own printers tickets for many diverse events using this system.

Note also that while in the embodiment, the purchaser transmits the unique data pertaining to the stock material to the seller, a system could be devised whereby the unique information is sent by a third party in response to a trigger supplied by the user. This trigger could be automatically generated by the printer scanning the paper and accessing a remote or local data base, or by the data base keeping track of the user's use of the stock and sending the next number in a sequence. The unique code on the stock could, for example, be printed at the time of the transaction under control of a source other than the seller.

Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the invention as defined by the appended claims. Moreover, the scope of the present application is not intended to be limited to the particular embodiments of the process, machine, manufacture, composition of matter, means, methods and steps described in the specification. As one of ordinary skill in the art will readily appreciate from the disclosure of the present invention, processes, machines, manufacture, compositions of matter, means, methods, or steps, presently existing or later to be developed that perform substantially the same function or achieve substantially the same result as the corresponding embodiments described herein may be utilized according to the present

